

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte ALAN G. COCCONI

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Appeal No. 1996-1427  
Application 08/029,028<sup>1</sup>

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ON BRIEF

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Before HAIRSTON, FLEMING, and FRAHM, Administrative Patent Judges.

FRAHM, Administrative Patent Judge.

DECISION ON APPEAL

Appellant has appealed to the Board from the examiner's final rejection of claims 1 to 7, which

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<sup>1</sup> Application for patent filed March 10, 1993.

constitute all of the pending claims in the application before us.

### BACKGROUND

The subject matter on appeal is directed to control electronics for an induction motor (i.e., polyphase inverter), and more specifically to an apparatus and method for controlling slip frequency of a motor so as to eliminate clipping of AC motor drive signals throughout an operating range of the motor (see appellants' Figure 2 and page 1 of the specification). As stated by appellant at page 2 of the specification, clipping of the output voltage of the motor reduces its efficiency and increases instability. The control or anti-clipping circuit of the invention of claims 1 to 7 on appeal includes a means for (see representative claim 1), and step for (see representative claim 6), adjusting slip frequency as a function of a comparison output in order to progressively increase slip frequency as the electromotive force of the motor nears the power supply voltage. The comparison output is the result of a comparison between a power supply voltage and the electromotive force of the motor. As stated by applicant in the Summary of the Invention section of the specification, "[t]he inverter can thus operate at maximum modulation anywhere in the operating range of the motor without clipping the output voltage sine wave" which "allows maximum power output and efficiency over the entire operating range" (specification, page 4). Thus, as motor peak output voltage approaches the power supply voltage level, motor drive waveforms are not distorted (see specification, page 4).

Representative independent apparatus claim 1 is reproduced below:

1. An anti-clipping circuit for a polyphase electric motor driven by a polyphase inverter with the polyphase inverter receiving electrical power from a power supply and generating motor drive signals phase currents that are a function of a rotor frequency and a slip frequency, said anti-clipping circuit comprising:

first sensing means for sensing an electromotive force of the motor;

second sensing means for sensing a voltage of the power supply;

comparison means coupled to the first and second means for comparing the electromotive force of the motor with the power supply voltage and producing a comparison output that varies as a function of a difference between the electromotive force of the motor and the power supply voltage; and

slip correction means for adjusting the slip frequency as a function of the comparison output to progressively increase the slip frequency as the electromotive force of the motor approaches the power supply voltage.

Representative independent method claim 6 is reproduced below:

6. A method of controlling a polyphase electric motor of the type that receives motor drive signals phase currents from a polyphase inverter, said polyphase inverter receiving electrical power from a power supply and generating the motor drive signals phase currents as a function of a rotor frequency and a slip frequency, said method comprising the steps of:

sensing an electromotive force of the motor;

sensing a voltage of the power supply;

comparing the electromotive force of the motor with the power supply voltage and generating a comparison output that varies as a function of a difference between the electromotive force of the motor and the power supply voltage; and

adjusting the slip frequency as a function of the comparison output to progressively increase the slip frequency as the electromotive force of the motor approaches the power supply voltage.

The following references are relied on by the examiner:

Cornell	4,041,361	Aug. 9, 1977
Danz et al. (Danz)	4,543,520	Sep. 24, 1985
Muscovac et al. (Muscovac)	4,727,305	Feb. 23, 1988

Claims 1 to 7 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Cornell or Muscovac in view of Danz.

Rather than repeat the positions of appellant and the examiner, reference is made to the Brief and the Answer for the respective details thereof.<sup>2</sup>

### OPINION

In reaching our conclusion on the issues raised in this appeal, we have carefully considered appellant's specification and claims, the applied references, and the respective viewpoints of appellant and the examiner. As a consequence of our review, we are in general agreement with appellant (Brief, pages 5 to 8) that the claims on appeal would not have been obvious to one of ordinary skill in the art at the time the invention was made in light of the collective teachings of the applied references. We find

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<sup>2</sup> We note that the after final remarks submitted December 12, 1994, have been considered by the examiner as indicated in the Advisory Action. We also note that the supplemental Reply Brief which provided the "Real Party In Interest" and "Related Appeals and Interferences" information, was received September 22, 1997.

that the examiner has failed to make out a prima facie case of obviousness. For the reasons which follow, we will not sustain the decisions of the examiner rejecting claims 1 to 7 under 35 U.S.C. § 103.

We first turn to appellant's argument (Brief, pages 5 and 7) that the recited slip correction means (see representative claim 1) and the recited slip correction step (see representative claim 6) are neither taught nor suggested by the applied references. Because we agree with appellant, we will reverse the decision of the examiner rejecting claims 1 to 7 under 35 U.S.C. § 103.

Appellant correctly states that the examiner admits (see final rejection) that neither Cornell nor Muskovac teaches progressively increasing slip frequency as electromotive motor force approaches the power supply voltage as required by claims 1 and 6 on appeal. The examiner relies upon Danz (Figure 3) to teach this feature. We cannot agree with the examiner that the slip frequency adjustment recited in the claims on appeal is met by what is shown in Danz's Figure 3. We agree with appellant that "Danz does not sense the electromotive force of the motor and therefore does not use the difference between the electromotive force of the motor and the power supply voltage as a means for regulating the slip frequency" (Brief, page 6). Danz uses stator current,  $I_s$ , as shown in Figures 2 and 3. We find that Danz does not sense or compare a power supply voltage, but instead uses a constant "M" which serves to exponentially increase slip frequency. Cornell uses stator current as shown in Figure 2. Muskovac also uses motor current (see line "e" in Figure 2A). The examiner has failed to make a prima facie case that the collective teachings of the applied references would have taught or suggested the voltage and

electromotive force sensing and comparing and resultant slip correction as claimed. The examiner has also

failed to sufficiently explain how the applied references would be combined to meet the subject matter recited in the claims on appeal.

We agree with appellant (Brief, page 8) that there would have been no motivation to compare an electromotive motor force with a supply voltage in order to increase slip frequency to prevent clipping. The Answer does not state a ground of rejection, nor does the Answer even refer to a previous rejection. The only statement of the rejection of record is found at page 3 of the final rejection. The examiner provides no other motivation for making the combination other than to simply say that "it would have been obvious [to][sic] progressively increase the slip frequency as taught by Danz" (final rejection, page 3). We can find no motivation for modifying Cornell or Muskovac with Danz. Accordingly, we find that the examiner has not made a prima facie case of obviousness.

We turn last to appellant's argument (Brief, page 5) that the rejection is based on impermissible hindsight. It must be recognized that any judgement on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See In

re McLaughlin, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). We agree with appellant that the reasoning of the obviousness rejection in the final Office action took into account knowledge gleaned only from applicant's disclosure. Specifically, one would have to look to applicant's disclosure for direction to sense and compare an electromotive motor force and a power supply voltage for use in adjusting the slip frequency to prevent clipping.

In light of the foregoing, the differences between the subject matter recited in the claims and the references are such that the claimed subject matter as a whole would not have been obvious within the meaning of 35 U.S.C. § 103. Accordingly, we shall reverse the standing rejection of claims 1 to 7 on appeal.

CONCLUSION

The decision of the examiner rejecting claims 1 to 7 under 35 U.S.C. § 103 is reversed.

REVERSED

KENNETH W. HAIRSTON  
Administrative Patent Judge

MICHAEL R. FLEMING  
Administrative Patent Judge

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Application 08/029,028

ERIC FRAHM  
Administrative Patent Judge

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